CLAIMS

What is claimed is:

1. A process for separating carbon dioxide from a reactor effluent stream, the reactor effluent stream comprising water, carbon dioxide, and olefin(s), the process comprising the steps of:

   (a) quenching the reactor effluent stream with a quench medium in a quench device to produce a quench bottoms stream comprising water and a quenched effluent stream comprising the olefin(s);

   (b) contacting the quenched effluent stream with an alkaline stream to remove at least a portion of the carbon dioxide; and

   (c) combining at least a portion of the alkaline stream with the quench medium.

2. The process of claim 1, wherein the pH of step (a) quenching is greater than 7.

3. The process of claim 1, wherein the quench medium has a pH ranging from about 7.1 to about 11.5 as it enters the quench device.

4. The process of claim 1, wherein the step of (a) quenching removes 30 wt.% or more of the carbon dioxide from the reactor effluent stream based upon the total amount of carbon dioxide in the reactor effluent stream before the step of (a) quenching.

5. The process of claim 1, wherein the step of (a) quenching removes 95 wt.% or more of the water from the reactor effluent stream based upon the total amount of water in the reactor effluent stream before the step of (a) quenching.

6. The process of claim 1, wherein the quench medium is an aqueous solution.

7. The process of claim 1, wherein the quench medium comprises caustic.

8. The process of claim 1, wherein the reactor effluent stream further comprises from about 0.05 wt.% to about 5 wt.% alcohol based upon the total weight of the reactor effluent stream before the step of (a) quenching.

9. The process of claim 1, wherein the reactor effluent stream further comprises from about 0.05 wt.% to about 5 wt.% methanol based upon the total weight of the reactor effluent stream before the step of (a) quenching.

10. The process of claim 1, wherein the step of (b) contacting occurs at a pH greater than about 13.

11. The process of claim 1, wherein the alkaline stream has a concentration of 1 wt.% or more based upon the total weight of the alkaline stream.

12. The process of claim 1, wherein the quenched effluent stream has a concentration of carbon dioxide that is less than about 1000 ppm based upon total weight of the quenched effluent stream after the step of (b) contacting.

13. The process of claim 1, wherein the carbon dioxide in the alkaline stream is from the reactor effluent stream.

14. A process for producing an olefin product stream from an oxygenate feed stream, the process comprising the steps of:

(a) contacting the oxygenate feed stream with a catalyst to produce a reactor effluent stream, the reactor effluent stream comprising water, carbon dioxide and olefin(s);

(b) quenching the reactor effluent stream with a quench medium to remove water and produce a quenched effluent stream comprising the olefin(s) and carbon dioxide;

(c) contacting the quenched effluent stream with an alkaline stream to separate carbon dioxide from the quenched effluent stream; and

(d) combining at least a portion of the alkaline stream with the quench medium.

15. The process of claim 14, wherein the pH of the step of (b) quenching is greater than 7.

16. The process of claim 14, wherein the quench medium has a pH ranging from about 7.1 to about 11.5 as it enters the quench device.

17. The process of claim 14, wherein the step of (b) quenching removes 30 wt.% or more of the carbon dioxide from the reactor effluent stream based upon the total amount of carbon dioxide in the reactor effluent stream before the step of (b) quenching.

18. The process of claim 14, wherein the step of (b) quenching removes 95 wt.% or more of the water from the reactor effluent stream based upon the total amount of water in the reactor effluent stream before the step of (b) quenching.

19. The process of claim 14, wherein the quench medium comprises a caustic.

20. The process of claim 14, wherein the reactor effluent stream further comprises from about 0.05 wt.% to about 5 wt.% alcohol based upon the total weight of the reactor effluent stream before the step of (b) quenching.

21. The process of claim 14, wherein the reactor effluent stream further comprises from about 0.05 wt.% to about 5 wt.% methanol based upon the total weight of the reactor effluent stream before the step of (b) quenching.

22. A process for making a polyolefin product comprising polymerizing olefin(s) produced in claim 14 to make the polyolefin product.

23. The process of claim 14, wherein the step of (c) contacting occurs at a pH greater than about 13.

24. The process of claim 14, wherein in the step of (c) contacting the alkaline stream has a concentration of 1 wt.% or more.

25. The process of claim 14, wherein the quenched effluent stream has a concentration of carbon dioxide that is less than about 1000 ppm based upon total weight of the quenched effluent stream after the step of (c) contacting.

26. The process of claim 14, wherein the quenched effluent stream has a concentration of carbon dioxide that is less than about 1000 ppm based upon total weight of the quenched effluent stream after the step of (c) contacting.

27. A process for producing an olefin product stream, the process comprising the steps of:

(a) withdrawing a reactor effluent stream, the reactor effluent stream comprising water, carbon dioxide and olefin(s);

(b) quenching the reactor effluent stream at a pH ranging from about 7.1 to about 11 to remove water and produce a quenched effluent stream; and

(c) washing the quenched effluent stream with an alkaline stream at a pH greater than about 13, wherein the pH of the step of (b) quenching is adjusted by using at least a portion of the alkaline stream.

28. The process of claim 27, wherein the pH of the step of (b) quenching is greater than 7.

29. The process of claim 27, wherein the step of (b) quenching occurs in a quench device and the quench medium has a pH ranging from about 7.1 to about 11.5 as it enters the quench device.

30. The process of claim 27, wherein the step of (b) quenching removes 30 wt.% or more of the carbon dioxide from the reactor effluent stream based upon the total amount of carbon dioxide in the reactor effluent stream before the step of (b) quenching.

31. The process of claim 27, wherein the step of (b) quenching removes 95 wt.% or more of the water from the reactor effluent stream based upon the total amount of water in the reactor effluent stream before the step of (b) quenching.

32. The process of claim 27, wherein the quench medium is an aqueous solution.

33. The process of claim 27, wherein the quench medium comprises caustic.

34. The process of claim 27, wherein the reactor effluent stream further comprises from about 0.05 wt.% to about 5 wt.% alcohol based upon the total weight of the reactor effluent stream before the step of (b) quenching.

35. The process of claim 27, wherein the reactor effluent stream further comprises from about 0.05 wt.% to about 5 wt.% methanol based upon the total weight of the reactor effluent stream before the step of (b) quenching.

36. The process of claim 27, wherein in the step of (c) washing the alkaline stream having a concentration of 1 wt.% or more.

37. The process of claim 27, wherein the quenched effluent stream has a concentration of carbon dioxide that is less than about 1000 ppm based upon total weight of the quenched effluent stream after the step (c) of washing.

38. A process for producing a polyolefin, the process comprising the steps of:

(a) converting the oxygenate feed stream into an effluent stream comprising water, carbon dioxide and olefin(s);

(b) quenching the effluent stream thereby separating a majority of the water and a first portion of the carbon dioxide from the effluent stream;

(c) separating a second portion of carbon dioxide from the effluent stream;

(d) isolating a product stream comprising olefin(s) from the effluent stream; and

(e) polymerizing the olefin(s) to produce a polyolefin.

39. The process of claim 38, wherein the pH of the step of (b) quenching is greater than 7.

40. The process of claim 38, wherein the quench medium has a pH ranging from about 7.1 to about 11.5 as it enters the quench device.

41. The process of claim 38, wherein the step of (b) quenching removes 30 wt.% or more of the carbon dioxide from the effluent stream based upon the total amount of carbon dioxide in the effluent stream before the step of (b) quenching.

42. The process of claim 38, wherein the step of (b) quenching removes 95 wt.% or more of the water from the effluent stream based upon the total amount of water in the effluent stream before the step of (b) quenching.

43. The process of claim 38, wherein the quench medium is an aqueous solution.

44. The process of claim 38, wherein the quench medium comprises caustic.

45. The process of claim 38, wherein the effluent stream further comprises from about 0.05 wt.% to about 5 wt.% alcohol based upon the total weight of the effluent stream before the step of (b) quenching.

46. The process of claim 38, wherein the effluent stream further comprises from about 0.05 wt.% to about 5 wt.% methanol based upon the total weight of the effluent stream before the step of (b) quenching.

47. The process of claim 38, wherein the step of (c) separating occurs at a pH greater than about 13.

48. The process of claim 38, wherein in the step of (c) separating the alkaline stream having a concentration of 1 wt.% or more.

49. The process of claim 38, wherein the effluent stream has a concentration of carbon dioxide that is less than about 1000 ppm based upon total weight of the effluent stream after the step of (b) separating.

50. The process of claim 38, wherein the carbon dioxide in the alkaline stream is from the effluent stream.